



PUGET SOUND AIR POLLUTION CONTROL AGENCY  
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December 8, 1995

Gerald J. Brown  
Manager Safety and Environment  
Ash Grove Cement Company  
3801 East Marginal Way  
Seattle, Washington 98134

Dear Mr. Brown:

**Study Plan for Evaluating Fugitive Dust Impact Problems at Terminal 106**

Thank you for having McCulley, Frick and Gilman, Inc. forward a copy of their Fugitive Dust Study Plan for the Ash Grove Cement Company Seattle Plant to us on November 30, 1995. Our interest is for Ash Grove Cement to cease the violations of Regulation I, Section 9.11 that have occurred at Terminal 106. We hope that the results of the study will assist Ash Grove in eliminating fallout and the resulting complaints.

However, this does not satisfy our need for a legally binding commitment from Ash Grove to eliminate the fallout problem at Terminal 106 and comply with Regulation I, Section 9.11. We have not yet received this commitment and are reviewing our options for further enforcement action. If you have any questions, please call me at (206) 689-4050.

Sincerely,

*David D. Kircher*

David S. Kircher  
Manager – Engineering

DSK:ls

cc: H. Voldbaek, Ash Grove Cement  
R. Hinrichs, Stoneway Concrete  
K. Benham, Port of Seattle  
J. Willenberg, F. Austin, E. Gilpin, M. McAfee, R. Busterna, PSAPCA

Dennis J. McLerran, Air Pollution Control Officer

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**G**  
McCulley  
Frick &  
Gilman, inc.

November 30, 1995

Mr. Fred Austin  
Puget Sound Air Pollution Control Agency  
110 Union Street, Suite 500  
Seattle, WA 98101-2038

Dear Mr. Austin:

On behalf of Ash Grove Cement Company, I am submitting the enclosed study plan for evaluating the fugitive dust impact problems near the Ash Grove plant in south Seattle. In view of the urgency of the issue, and Ash Grove's desire to solve the problem as quickly as possible, Ash Grove has instructed me to begin work on the project on Monday, December 4. If you have comments or questions on the study plan, we urge you to provide them as soon as possible. We will attempt to incorporate any ideas or concepts you may have on the study plan as we proceed.

Feel free to contact me directly with any technical issues. Jerry Brown at Ash Grove (206 - 623-5596) can be contacted regarding any issues, both technical and administrative. We look forward to an early resolution to the fugitive dust problem.

Sincerely,  
*McCulley, Frick & Gilman, Inc.*

Kirk D. Wings  
Atmospheric Sciences Group

cc. Jerry Brown, Ash Grove Cement



# ***Ash Grove Cement Company Seattle Plant***

## **FUGITIVE DUST STUDY PLAN**

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Prepared by: Kirk Winges  
November 29, 1995

### **Introduction**

Ash Grove Cement Company owns and operates a new, state-of-the-art, Portland Cement production plant in the Duwamish industrial area of Seattle. A large rotary kiln is used to produce cement clinker. The clinker is cooled, crushed and mixed with gypsum to form the finished cement product. Ash Grove has asked McCulley, Frick & Gilman, Inc. (MFG) to assist in resolving a fugitive dust issue. The purpose of the current document is to summarize what is known about the issue at present and present a plan and schedule for investigating and reporting on the causes and recommended remedies for the dust problem.

### **Background**

Portland cement is an inherently dusty material. Great care is taken at the Ash Grove facility, as it is at most cement production plants, to prevent dust from being released to the general atmosphere. Despite these steps, some dust formation and release is inevitable. However, these routine, expected levels of dust emission would not normally be expected to result in measurable impacts. The subject of the present study is the report of dust impacts which are above and beyond what would normally be expected from the plant, given the steps that are taken to prevent dust emissions.

The specific issue addressed here concerns complaints filed by a neighboring facility that allege dust from the Ash Grove plant settles on parked motor vehicles. The neighboring facility is owned by the Port of Seattle, and employees of a company that leases space from the Port complain that dust from the Ash Grove plant has deposited in large quantities on their vehicles while parked in front of the Port's building. The Puget Sound Air Pollution Control Agency (PSAPCA) has observed dust on some of these vehicles and collected samples of dust for subsequent laboratory analysis. The analytical results from two samples confirmed that the deposited material consisted of 65% and 44% cement clinker dust. Based on these observations, PSAPCA issued four Notices of Violation (NOV) to Ash Grove Cement Company.

Ash Grove Cement Company has conducted internal surveys of the their own facility in an attempt to determine the source of the dust causing the deposition impact. The analytical results



obtained by PSAPCA provide important clues to Ash Grove on the possible areas of the plant which may be responsible. The results clearly suggested the dust contained a portion of cement clinker, not finished cement. Since clinker is produced midway through the process, and is transformed to final product towards the end of the process, this information eliminates many possible sources of dust, such as the raw materials receiving and handling operation or the finished product storage or loadout operation.

Despite the restriction to a fairly narrow part of the plant operation, no obvious answer to the source of dust has been found. Although a few minor sources of dust have been identified, there was no obvious culpable source for the alleged impacts. MFG was asked to assist Ash Grove in identifying those sources most likely to be responsible for the observed dust levels and to provide recommendations on steps that might be taken to reduce or eliminate the impacts altogether. The current document is a study plan for MFG's investigation.

## Technical Concepts

Fugitive dust issues are often difficult to resolve. A facility, such as the Ash Grove plant, has many potential sources of dust, and quantification is virtually impossible. Even if quantified, it is often not the largest sources of dust which are responsible for the majority of the impacts. In many cases location and variable nature of the emission rate control the relative contributions from individual sources.

There are several different types of dust sources at the facility, and it is useful to group the sources into three different classes which can then be addressed individually. The classes are:

- Continuous Sources. These are normal sources of dust which are known, and are a part of the operation of the plant. It includes baghouse dust vents, exposed portions of conveyors, dust collectors, the main exhaust stack from the facility, traffic on plant roads and any other normal source of dust which can be identified, exclusive of wind erosion sources which are addressed separately.
- Intermittent Sources. These are irregular sources, which generally reflect unusual or upset conditions. Start-up emissions, and shut down emissions are included in this class. Of specific interest is the dust which is released from the discharge end of the planetary coolers during a shut-down event. Also, construction or temporary emissions configurations during plant modifications fall in the classification of intermittent sources.
- Wind Erosion Sources. Wind erosion sources are normal sources from the facility, but they are highly variable -- dependant on the speed of the wind, rather than the status of plant operation. These emissions can occur during normal operations, during start-up or shut-down, or even while the plant is not operating.



The MFG study plan has been structured around examining these three different classes of sources at the plant. A comprehensive list of sources for each class will be compiled. Once compiled, the list will be rank ordered, across classes, to identify those sources most likely to be responsible for the dust impacts. It is recognized that this latter step is the most difficult part of the process, since many of the sources are variable.

The roof of the Port's building is also of importance. The roof is a large, relatively flat expanse of surface which may act as a temporary holding area for dust. It may act much like a buffer, which allows dust particles to collect for a period of time with lower wind speeds, then be flushed of dust during a higher wind event, with the resulting deposition on surrounding parked vehicles.

Particle size is also an important physical property. Some evidence from the analytical results suggested many of the particles were larger than typical airborne dust. In fact, some of the sizes may be too large for suspension in the atmosphere. One possible scenario which could result in large particles being carried that long distance, from the clinker area of the plant to the location where vehicles with dust have been observed, is that large particles are released at some height at the facility, they fall as they are carried by the wind and impact the roof of the Port's building. They are then transported along the surface of the roof in a series of bounces by a process known as saltation. Eventually, they fall off the end of the building and onto parked vehicles. If this process is important, it strongly suggests an elevated source of dust, since large particles released at ground level would have great difficulty getting over the Port building.

Based on these technical considerations, the following study plan has been developed to attempt to determine the source of dust and recommend corrective actions which will reduce the impact on surrounding vehicles.

## Scope of Work

**Task 1. Data Acquisition.** During this task, MFG will make several visits to the Ash Grove facility and other relevant locations. The efforts to be accomplished will include:

- Gaining access to the roof of the Port building and examining for signs of deposition and saltation behavior.
- If possible, conducting conversations with the parties who have experienced deposition on their vehicles to obtain more information on the times, locations, frequency and severity of dust deposition on the vehicles. Of particular interest here is the dates and times when impacts have occurred. MFG may also survey PSAPCA to determine these times. MFG will attempt to obtain meteorological data from nearby monitoring stations, operated by PSAPCA or others, during the deposition events. Such factors as wind speed, wind direction, temperature, precipitation and even relative humidity, may be important in understanding the nature of the impact causes.



- Surveying the Ash Grove facility in detail to identify, catalog and describe every potential source of dust at the facility, using the three classes above as a framework for study. Particular attention will be paid to exposed areas where clinker material may be subject to wind erosion.
- Obtaining records from Ash Grove on continuous sources of emission such as stack test results, permit levels, fuel consumption rates, etc. For those sources which have not been tested or previously quantified, obtain information on flow rates and any manufacturer's outlet grain loading guarantees.
- Obtaining information from Ash Grove on upset conditions. To the degree possible, defining all sources of dust which are intermittent in nature and assessing the level of emissions of dust from each.
- Meeting with PSAPCA. Of particular interest is viewing better copies of the photo-micrographs from the dust samples. MFG is particularly interested in particle size information as well as confirming that the source of dust is clinker, not finished cement. Although this was a conclusion of the laboratory, it is not easily defended from the poor quality FAX/photocopy versions of the photo-micrographs MFG has seen thus far.
- Holding discussions and meetings with Ash Grove to obtain any other relevant information on dust emissions and impacts.

**Task 2. Data Analysis.** The purpose of this task will be to rank order the sources in terms of the importance in the overall dust impact issue. Based on the information gained during the roof survey and the discussions with personnel at the impact location, as well as information obtained during discussions with PSAPCA and review of the photo-micrographs, MFG will focus the investigation on the sources of dust at the Ash Grove plant. Starting with the classified list, MFG will first rank order the sources of dust within each class. For continuous sources, air quality modeling analysis may be used to confirm the relative rank ordering in terms of impact to the vehicles in the parking area. For the intermittent sources, modeling may not be possible, since emission rates may be too variable, or not quantifiable. Rank ordering will be based on the estimated magnitude from Ash Grove personnel observations and the recorded frequency of the upset condition. For wind erosion sources, three factors will determine the relative ranking of each source: the area of the source, the erodability of the surface area itself (MFG may devise some simple test method to determine the erodability), and the location/elevation of the source with respect to the point of observed impact. The time of complaints and meteorological information obtained during task 1 may be important in refining the wind erosion sources.

Following the in-class rank ordering, MFG will rank the sources of dust across classes. This is expected to be the most difficult part of the project. It will require an understanding of the types of conditions (meteorological and plant emission conditions) which produce the dust



impacts on the vehicles. It will require some knowledge of the particle sizes which are responsible for the majority of the impact. Finally, it will require an understanding of the possible buffering and delay effect produced by the roof of the Port's building.

Task 3. Reporting. The final task will be the preparation of a final report documenting all the findings of MFG's investigation. The report will present the data collected, the assumption used and the conclusions of the investigation. In addition to the identification of the sources thought to be most responsible for the impact to the vehicles at the Port's facility, the MFG report will present recommendations on steps which might be taken by Ash Grove to reduce or eliminate the impact.

## Schedule

MFG is prepared to commence work on this effort immediately. Assuming a start date of December 4 (Monday), we anticipate the following schedule for the project.

Task 1 - Data Acquisition	December 4 - December 31
Task 2 - Data Analysis	January 2 - January 12
Task 3 - Reporting	January 15 - January 26

Delivery of the final report would be on January 26. This schedule assumes prompt responses to all data requests, the availability of Ash Grove personnel to work with MFG during the early phases of the project, prompt access to the roof at the Port building, and the availability of PSAPCA to meet with MFG.





PUGET SOUND AIR POLLUTION CONTROL AGENCY  
KING COUNTY KITSAP COUNTY PIERCE COUNTY SNOHOMISH COUNTY

September 19, 1995

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SEP 20 1995

AGCW-SEATTLE

Scott Pattison, Director of Logistics  
Port of Seattle  
PO Box 1209  
Seattle, WA 98111

Dear Mr. Pattison:

Fallout Complaints - Terminal 106

The purpose of this letter is to provide you with a status report on our investigation of particle fallout complaints at the Port's Terminal 106 Building. Past fallout complaints were prompted by dust material collecting on private property and cars and causing such damage as etching, scratching and chemical reaction with surfaces.

Our Agency has implemented the sampling program described in my letter to you of August 14, 1995 to identify the possible sources of materials that are causing the damage to the complainant's property. We collected fallout samples at Terminal 106 on August 25, 1995 and September 12, 1995. We have received preliminary results from our contract laboratory, Construction Technology Laboratories, Inc., (CTL) for the August 25 sample and for an earlier sample collected on May 15, 1995 associated with Agency enforcement actions. Both of these samples were determined by CTL in their first analysis to contain ground portland cement clinker as well as particles of other origins. Complete analysis results will be forwarded to you as soon as the Agency receives the final report.

Additional analytical techniques may be needed for these 2 samples to better characterize and quantify the amount of the various constituents other than clinker. We are also working with our laboratory to determine which types of source samples may need to be collected to help identify specific responsibility for the particulate fallout complaints.

After we have the results of this further analysis, I suggest that we convene another meeting of the interested parties to discuss how to reduce fallout and eliminate future complaints.

If you have any questions, please call me at (206) 689-4050.

Sincerely,

*David D. Kircher*

David S. Kircher  
Manager - Engineering

DSK/lh

cc: Ed Pierce, Ash Grove Cement  
Rick Hinrichs, Stoneway Concrete  
Keith Benham, Port of Seattle  
F. L. Austin  
J. M. Willenberg  
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